

CASE FR-7095

**REMARKS**

Claims 1-6, 8-23, 32-35, and 40-84 are in the case.

Applicants have received a copy of Form PCT/IB/332, which states that certified copies of the priority document have been forwarded to the designated states, of which the United States is one. A further copy of the priority document was requested from the International Bureau on March 4, 2004, to be sent directly to the U.S. Patent and Trademark Office. Three of the cited references were published after the priority date, and are thus not effective as prior art against this application. The references are Chisolm et al., U.S. 6,300,405; Bryant et al., U.S. 5,936,021; and Basset et al., U.S. 6,235,837. However, out of an abundance of caution due to the apparent non-receipt of priority documents in the U.S. Patent Office, these references will be addressed in the responses to the substantive rejections below.

Herein, the Office Action of January 21, 2004, is sometimes referred to as "the present Office Action," and the Office Action of August 12, 2003, is sometimes referred to as "the previous Office Action."

Applicants note with disappointment that not a single rejection of the sixty-one rejections made in the previous Office Action was overcome by any of the submitted amendments and/or remarks (which is clear from the Examiner's statement in the present Office Action, at Page 3, last paragraph that "the rejections are maintained"). In the response to the previous Office Action, Applicants substantively addressed all of the many rejections made by the Examiner. It is not understood why *all* of the arguments, particularly in light of the amendments made, were found unpersuasive as to *all* of the claims in the case.

Applicants are aware that current caselaw indicates that the number of references cited in support of a rejection does not, by itself, indicate patentability or a lack of patentability. ("The criterion, however, is not the number of references, but what they would have meant to a person of ordinary skill in the field of the invention.") *In re Gorman*, 933 F.2d 982, 986, 18 U.S.P.Q.2d 1885 (Fed. Cir. 1991). Moreover, while the number of references is not necessarily an indication of obviousness or lack thereof, this varies with the art area. Here, it is felt that the Examiner's need to cite eighteen references, in various combinations and permutations, shows that the invention is patentable. If the invention were obvious, there

## CASE FR-7095

would be no need to cite so many references. Hence, the number of references cited in the present case is evidence of lack of support for rejection of the present claims.

In the present case, each individual rejection has at most two references cited to in support of the rejection. Thus, the problem is not necessarily the number of references per rejection, but the total number of rejections made. In this connection, Applicants feel that the total number of rejections is excessive and quite burdensome. A total of nine separate § 102 rejections have been made, by virtue of the nine references that have been cited in the alternative in these rejections. But this pales in contrast to the *one hundred* obviousness rejections (found by totaling all of the various cited § 103 combinations).

At the risk of belaboring the point regarding the number of rejections made in the present case, it has been held that a statement of a rejection that includes a large number of rejections must explain with reasonable specificity at least one rejection, otherwise the examiner procedurally fails to establish a *prima facie* case of obviousness. *Ex parte Blanc*, 13 U.S.P.Q.2d 1383 (Bd. Pat. App. & Inter. 1989; M.P.E.P. § 2142). Such reasonable specificity is lacking regarding the three sets of obviousness rejections in the present case. In *Ex parte Blanc*, the Board further stated, "[O]ne cannot make omelettes of bad eggs--no matter how many are used. One good reference is better than 50 poor ones, and the 50 do not make the one any better." (Quoting *In re Herrick* 344 F.2d 713, 145 U.S.P.Q. 400 (C.C.P.A. 1965), quoting from *Ball & Roller Bearing Co. v. F.C. Sanford Mfg. Co.*, 297 F.2d 163, 167 (2d Cir.1924)).

Because of the Examiner's tenacity in rejecting all of the present claims, viz., the near doubling of the number of obviousness rejections from fifty-four in the previous Office Action to one hundred in the present Office Action, it is thought that the Examiner may have based the rejection on personal knowledge, at least in part. Applicants request the provision of such personal knowledge, in order to have an opportunity to properly respond to a rejection based on such personal knowledge. See 37 C.F.R. § 1.104(d)(2).

Some of the rejections presented in the present Office Action will be addressed together with some of those still standing from the previous Office Action, due to overlap in certain of these rejections.

CASE FR-7095

**A. Objection to Specification paragraph 0016**

By the above amendment to the Specification, the objection to the disclosure in paragraph 0016 is believed to have been removed. The subject matter of the claims as filed referred to in this paragraph has been incorporated into the paragraph, and the reference to the claims "as filed" has been deleted.

**B. Objection to Claims 83 and 84**

The objection to Claims 83 and 84 made in the present Office Action is believed moot in light of the amendment to Claim 83. The inclusion of the phrase "as set forth in this application as filed" was a clerical error, and this amendment is thus deemed not to change the scope of these claims.

**C. Rejection of Claims 1-23, 32-35, 40-59, 62, 63, and 66-84 under 35 U.S.C. § 112, second paragraph**

The above claims were rejected for being indefinite. The phrase "not more than about" does not apply to Claims 68 (in part) and 69 (in part), so it is submitted that this rejection does not apply to these claims, at least in part.

The phrase "not more than" places an upper limit upon the value recited thereafter, while "about" is an adjective which modifies the numerical value. This phraseology and construction in the present claims is quite clear to those of ordinary skill in the art, so the claims do in fact particularly point out and distinctly claim the invention. This rejection is improper and should be withdrawn.

Furthermore, the cited case, *Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd.*, states that "A decision as to whether a claim is invalid under this provision requires a determination whether those skilled in the art would understand what is claimed." 927 F.2d 1200, 1217, 18 U.S.P.Q.2d 1016 (Fed. Cir. 1991). The facts in *Amgen* are very different from the situation herein. In *Amgen*,

The district court found that "bioassays provide an imprecise form of measurement with a range of error" and that use of the term "about" 160,000 IU/AU, coupled with the range of error already inherent in the specific activity limitation, served neither to distinguish the invention over the close prior art (which described preparations of 120,000 IU/AU), nor to permit one to know what specific activity values below 160,000, if any, might constitute infringement. 927 F.2d 1217.

In the present case, the quantity referred to is the melt flow index of a polypropylene

CASE FR-7095

homopolymer. Melt flow indices are not subject to errors as large as the bioassay measurements which were ambiguous in *Amgen*. Thus, there is no indefiniteness in the presently claimed invention, and this rejection should be withdrawn.

**D. Rejection of Claims 1-5, 7-19, 24-68, 70 and 72 under 35 U.S.C. § 112, first paragraph**

The above claims were rejected for lack of enablement. The arguments presented in response to the previous Office Action are hereby reiterated by reference.

Three references were cited for the first time in the present Office Action. Itoh et al., U.S. 5,760,120, as pointed out by the Examiner, does teach the use of zinc borate - but as a filler (column 10, lines 7-9), which does not suggest anything about the properties of zinc borate in relation to flame retardants. The other two newly cited references, however, clearly *do* suggest zinc borate as having beneficial properties for flame retardance. In Murtha et al., U.S. 4,001,182, zinc borate is described as a synergist (column 8, lines 51-56). Kawahigashi et al., U.S. 5,656,371, lists zinc borate as an inorganic flame retardant (column 5, lines 1-8).

It should further be noted that both Murtha et al. and Kawahigashi et al., as well as Fuhr et al. and Nakahashi et al., have been cited as anticipatory by the Examiner. Thus, these references, which have favorable statements concerning the use of zinc borate in flame retardant applications, are presumably considered by the Examiner to be relatively close to the present invention, and thus support the use of zinc sulfide and zinc borate as flame retardant synergists. Hecht et al. and Garrison, Jr., the references cited to support lack of enablement, are each cited by the Examiner to support obviousness rejections, in combinations with other references, which means that the Examiner presumably considers these references to be too far away from the present invention to support an anticipation rejection. Furthermore, Hecht et al. and Garrison, Jr., refer to zinc sulfide and zinc borate as being ineffective as flame retardant synergists in polyethylene terephthalate only in the background section of the respective patents (Hecht et al., column 1, lines 51-55; Garrison, Jr., column 1, lines 36-41).

Moreover, as pointed out in the response to the previous Office Action, the *previous Office Action* is the source of the suggestion that the zinc compounds of the present claims are included in the compositions of the invention as flame retardant synergists. The evidence that these compounds are known in the art for their flame retardant properties has been

CASE FR-7095

discussed in the preceding paragraphs. The present claims merely require inclusion of one or more of the specified zinc compounds, as a component, not that such compounds possess or exhibit flame retardant properties. However, zinc borate is known in the art for its flame retardant properties (see *Hawley's Condensed Chemical Dictionary*, 13th edition, 1997, page 1196; enclosed as Exhibit A). On the other hand, zinc sulfide is known in the art as a pigment or whitening agent (see *Hawley's Condensed Chemical Dictionary*, 13th edition, 1997, page 1201; enclosed as Exhibit A). In the present application, zinc sulfide in mixtures with zinc borate or a mixed oxide of boron and zinc, is described as providing compositions having lighter coloration than when using only zinc borate (Specification, Page 11, paragraph 0032), while zinc borate or mixed oxide of boron and zinc are described as providing compositions tending to have higher comparative tracking indices (Specification, Pages 11-12, paragraph 0032).

As the Examiner points out, Applicants' Examples use a hydrated zinc borate. It is not understood why the absence of the water of hydration renders the rejected claims not enabled as to zinc borate, to say nothing of causing the claims to be not enabled in their entirety. Guidance from the M.P.E.P. is instructive. At § 2164.02, the M.P.E.P. states, "A single working example in the specification for a claimed invention is enough to preclude a rejection which states that nothing is enabled since at least that embodiment would be enabled." As there are twelve working Examples in the present application, it is clear that this rejection is unfounded. Furthermore, "The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation." *United States v. Telectronics, Inc.*, 857 F.2d 778, 785, 8 U.S.P.Q.2d 1217, 1223 (Fed. Cir. 1988); see also M.P.E.P. § 2164.01. No undue experimentation is necessary for a person of ordinary skill in the art to practice the claimed invention, whether using a zinc borate, a mixed oxide of zinc and boron, zinc sulfide, or a mixture of any two or more of these.

**E. Rejection of Claims 1-6, 8-10, 17-23, 32-43, 53-61, and 64-72 under 35 U.S.C. § 102 (b or e) and**

**Rejection of Claims 60, 61, 64, 65, 68, and 69 under 35 U.S.C. § 102 (b or e)**

The references cited in this rejection are the following:

Fuhr et al. 5,021,488,

Kyo et al. 4,171,330,

Nakahashi et al. 5,543,452,

CASE FR-7095

Ogo et al. 5,849,826,  
Gariess et al. 5,712,336,  
Tjahjadi et al. 5,863,974, *or*  
Chisolm et al. 6,300,405.

Each and every element of a claim must be taught in one embodiment of a single reference to sustain an anticipation rejection, as described in the response to the previous Office Action, submitted on December 12, 2003. See also M.P.E.P. § 2131. Also, at § 706.02 the M.P.E.P. states, "Prior art rejections should ordinarily be confined strictly to the best available art." Applicants submit that not all seven references constitute the best available art.

This rejection was originally addressed in the response to the previous Office Action. See also in regard to this rejection the arguments made therein. The arguments presented here to some extent summarize previously made arguments, because this rejection is at least in part from the previous Office Action.

Turning now to the substantive rejections, in order for one of the cited references to anticipate the presently claimed invention of Claims 1-6, 8-10, 17-23, 32-43, 53-59, and 70-72, that reference must teach a blend formed from

- (A) a thermoplastic polyamide *or* thermoplastic polyester polymer,
- (B) at least one organic halogen-containing flame retardant,
- (C) a zinc borate, a mixed oxide of zinc and boron, or zinc sulfide, or a mixture of any two or more of the foregoing; *and*
- (D) a propylene homopolymer having a melt flow index of not more than about 5 grams/10 minutes.

In addition, the blend must have an improved comparative tracking index as compared to said thermoplastic polyamide or said thermoplastic polyester polymer. None of the cited references teaches all of these elements in an embodiment, so the presently claimed invention is not anticipated.

None of the seven cited references listed above teaches element (D), a polypropylene homopolymer with a melt flow index of not more than about 5 grams/10 minutes. Many of the references cited in this rejection also do not teach improved electrical properties, much less an improved comparative tracking index. Kyo et al. only teaches lack of deterioration

CASE FR-7095

of the electrical properties, not *improved* electrical properties; no mention is made of the comparative tracking index. Ogo et al. does not teach anything regarding the electrical properties of the compositions reported; no mention is made of the comparative tracking index. Chisolm et al. does not teach improved electrical properties for the reported compositions. Two of the cited references contain even further differences from the present invention. The compositions taught by Kyo et al. require *both* a polyamide and a polyester. In Chisolm et al., the polyesters are required to have sulfonate units.

In order for one of the cited references to anticipate the presently claimed invention of Claims 60-61 and 64-69 as amended, that reference must teach a flame retardant additive composition comprising

- (i) at least one organic halogen-containing flame retardant,
- (ii) a zinc borate, a mixed oxide of zinc and boron, or zinc sulfide or any combination of any two or more of these, *and*
- (iii) an olefin-based polymer, in proportions of 0.5 to 40 parts by weight of (i) and 0.3 to 12 parts by weight of (ii) per part by weight of (iii).

None of the cited references teaches all of these elements in an embodiment, so the presently claimed invention is not anticipated.

None of the references cited to reject the claims on the basis of anticipation teaches additive compositions. At best, some of the references may teach that one or more olefin polymers can be included as an optional ingredient with the polyamide or polyester. One of the cited references, Fuhr et al., does not disclose olefin-based polymers anywhere in the document. It is felt that all seven rejections are unfounded and should be withdrawn.

**F. Rejection of Claims 1-72 under 35 U.S.C. § 103(a) and  
Rejection of Claims 60-69 under 35 U.S.C. § 103(a)**

It was felt that the references and their combinations cited for these rejections would be better illustrated in tabular form.

TABLE 1

Fuhr et al. 5,021,488,	in view of	Mathews et al. 4,187,113,
Kyo et al. 4,171,330,		Kinoshita et al. 5,824,394,
Nakahashi et al. 5,543,452,		Hecht et al. 4,338,243,

CASE FR-7095

Ogo et al. 5,849,826,		Frye 4,387,176 [sic],
Tjahjadi et al. 5,863,974 or		Garrison, Jr. 4,708,980,
Chisolm et al. 6,300,405,		Myszak, Jr. 5,409,980,
		Bryant et al. 5,936,021,
		Kamei et al. 5,874,176 or
		Basset et al. 6,235,837.

Again referring to M.P.E.P. §706.02, Applicants submit that not all of these references, or at the very least, not all of these combinations, constitute the best available art.

Some of the arguments presented in this section may summarize or repeat previously made arguments, because rejection is, at least in part, from the previous Office Action.

In the previous Office Action (at page 5), the Examiner states that because all of Applicants' limitations and materials are known, Applicants' invention would have been obvious. This is not enough to support an obviousness rejection under the statute. A statement that the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 U.S.P.Q.2d 1300, 1301 (Bd. Pat. App. & Inter. 1993; see also M.P.E.P. § 2143.01). Furthermore, the Examiner is required to point to something in the reference(s) that provides a *motivation or suggestion* to combine these references. The Federal Circuit has stated in *In re Frutch* that

"The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." 972 F.2d 1260, 1266, 23 U.S.P.Q.2d 1780, 1783-84 (Fed. Cir. 1992) (quoting *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125 (Fed. Cir. 1984)).

No such motivation or suggestion has been provided. Thus, all of the rejections listed in Table 1 are improper and should be withdrawn.

Furthermore, some of the cited combinations fall outside the boundary of permissibility for citation in an obviousness rejection. Some of the cited references are in nonanalogous art areas. The presently claimed invention is directed toward flame retardant compositions, particularly for use in electrical applications (Specification, Page 1, paragraph



CASE FR-7095

0002; page 2, paragraph 0006). The cited references that are nonanalogous art (and thus cannot properly be used in an obviousness rejection herein) are Mathews et al., which concerns blends for opaque films; Kinoshita et al., which is directed to laminated polyester films; Bryant et al., which teaches masterbatches for adhesives; and Basset et al., which is directed to compositions for making objects such as automobile fenders (column 1, lines 11-13). Thus, the rejections using combinations with these references are improper and should be withdrawn.

Other obviousness rejection combinations in Table 1 are improper for the additional reason that one or both of the references in the combination teach away from combination with the other reference. Both Hecht et al. and Garrison, Jr. teach away from combination with all six references in the left-hand column of Table 1 because both Hecht et al. and Garrison, Jr. both teach that zinc oxide, zinc sulfide, and zinc borate do not work with polyethylene terephthalate, while Fuhr et al., Kyo et al., Nakahashi et al., Ogo et al., Tjahjadi et al., and Chisolm et al. all teach the use of zinc compounds in their compositions.

Another cited reference, Frye, also teaches away from combinations with all of the six references listed in the left-hand column of Table 1 above. As described in the response to the previous Office Action, Frye teaches that there is no need to use a halogenated flame retardant, while all six of the references Frye is purported to be combined with teach the use of a halogenated flame retardant. Still another reference that teaches away from combination with all six references cited in the left-hand column of Table 1 is Myszak, Jr., which teaches flame retardant compositions for good optical properties, not good electrical properties. Kamei et al. teaches away from combinations with all six of the left-column references listed in Table 1. Kamei et al. teaches melt flow indices for polypropylene, while none of the six references with which it is supposedly combined teach anything about the melt flow index of polyolefins. Further, none of the six references teaches a need to form polyolefin grains in order to make the polyolefin blendable with a polyamide, as Kamei et al. does (column 5, lines 5-11).

In view of the unsupportability of the entire set of rejections listed above in Table 1, it is believed that the Examiner's request in the previous Office Action (Page 5, paragraph 9) is moot.

CASE FR-7095

**G. Rejection of Claims 60-69 under 35 U.S.C. § 102 (b)**

The references cited in this rejection are the following:

Murtha et al. 4,001,182 or

Kawahigashi et al. 5,656,371.

As stated in section E above, anticipation requires the reference to teach every element of the rejected claim in one embodiment for the anticipation rejection to be sustainable. The required elements for anticipating Claims 60-69 are listed above in section E.

Murtha et al. does not anticipate the presently claimed invention. First, Murtha et al. teaches at column 8, lines 24-44 (in the table) that the ratios of flame retardant to polymer and oxide to polymer are both 1-15 parts per 100 parts polymer, equal to 0.01-0.15 parts per single part of polymer, well below the amounts recited in Applicants' rejected claims (0.5-40:1 for the flame retardant and 0.3-12:1 for the zinc compound). Further, Murtha et al. teaches only flame retardants in which the halogen atoms are bound to aliphatic carbons (Abstract), so Murtha et al. certainly cannot anticipate Claims 64-69 of the present invention, which are directed to polybromoaromatic compounds. This rejection is unfounded and should be withdrawn.

Kawahigashi et al. teaches the use of syndiotactic polypropylene. A person of ordinary skill in the art must consider the embodiment in the reference to be the same as that in the claimed invention. "There must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention." *Scripps Clinic & Research Foundation, v. Genentech, Inc.*, 927 F.2d 1565, 1576, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). Syndiotactic polypropylene is known in the art to have different properties than isotactic polypropylene. Kawahigashi et al. itself tells us this, at column 1, lines 14-16, where it is stated that isotactic polypropylene is "inherently rigid," while syndiotactic polypropylene has "satisfactory flexibility" (column 3, lines 38-46). The olefin-based polymer of present Claims 60-69, as further described in the Specification (at Pages 12-13), would not be recognized by those of ordinary skill in the art to include syndiotactic polypropylene. The Examples in the present application used Novolen 1100H polypropylene homopolymer (Example 1, Page 19). As supported by Exhibit B, Novolen 1100 is an isotactic polypropylene. In addition, Exhibit C shows that syndiotactic polypropylene was not commercially available on a large scale until 2002, well after the

CASE FR-7095

priority date in this case (July 23, 1999). Thus, the disclosure in Kawahigashi et al. does not anticipate Claims 60-69, and this rejection should be withdrawn.

**H. Rejection of Claims 60-69 under 35 U.S.C. § 103 (a)**

It was felt that the references and their combinations cited for these rejections would be better illustrated in tabular form.

TABLE 2

Murtha et al. 4,001,182 <i>or</i>	in view of	Fuhr et al. 5,021,488,
Kawahigashi et al. 5,656,371		Kyo et al. 4,171,330,
		Nakahashi et al. 5,543,452,
		Ogo et al. 5,849,826,
		Tjahjadi et al. 5,863,974
		Chisolm et al. 6,300,405,
		Hecht et al. 4,338,243,
		Frye 4,387,176 [ <i>sic</i> ],
		Garrison, Jr. 4,708,980,
		Myszak, Jr. 5,409,980, <i>or</i>
		Bryant et al. 6,235,837 [ <i>sic</i> ].

In this set of combinations, the number of the Basset et al. patent (U.S. 6,235,837) was cited for the name Bryant et al. (U.S. 5,936,021). In order to expedite the withdrawal of this rejection, both Bryant et al. and Basset et al. will be addressed.

At the risk of sounding repetitive, Applicants refer to M.P.E.P. §706.02, and submit that not all of these references, or at the very least, not all of these combinations, constitute the best available art. Additionally, in the present Office Action (at page 4, paragraph 13), the Examiner states that the references "reveal all the ingredients used by applicants," making the invention obvious. This is not the standard for obviousness under the statute, and further uses an incorrect standard for obviousness rejections. First, it is well settled that the standard for obviousness is that the present invention *would have been* obvious, not *making* the invention obvious, as stated for this set of rejections in the present Office Action. Second, that the individual ingredients are known in the art is not sufficient to establish a *prima facie* case of obviousness in the absence of an objective reason to combine the references. The Examiner is still required to point to something in the reference(s) that provides a *motivation*

CASE FR-7095

*or suggestion* to combine these references, which has not been done in regard to any of the above combinations. It is felt that all of the rejections listed in Table 2 are improper and should be withdrawn.

Some of the combinations used to form the basis for rejection are improper for additional reasons. References from nonanalogous art areas are impermissible in an obviousness rejection. Claims 60-69 are directed to flame retardant additive compositions, which are useful for providing increased flame retardancy and increased comparative tracking index to thermoplastics (Specification, Page 4, paragraph 0014). The nonanalogous art references cited in this set of rejections are the Bryant et al./Basset et al. reference(s), and it is improper to use either one as a basis for rejection of the presently claimed invention. Bryant et al. teaches masterbatches for adhesives, and further does not teach any flame retardant at all in the compositions therein. Basset et al. is directed to compositions for making objects such as automobile fenders (column 1, lines 11-13), clearly an art area that is not analogous to flame retardant additive compositions. It is also felt worthwhile to again point out that both Bryant et al. and Basset et al. were issued after the priority date claimed in the present application, and should thus be inapplicable as prior art. Thus, the rejections using combinations with Bryant et al. or Basset et al. are improper for this additional reason, and should be withdrawn.

Combining Murtha et al. with Fuhr et al., Kyo et al., Nakahashi et al., Ogo et al., Tjahjadi et al., or Chisolm et al. would render each of Fuhr et al., Kyo et al., Nakahashi et al., Ogo et al., Tjahjadi et al., and Chisolm et al. inoperable for their intended purposes, which for all six of these references is not additive compositions, as are presently claimed in Claims 60-69. Additionally, combining Murtha et al. with any of Fuhr et al., Kyo et al., Nakahashi et al., Ogo et al., Tjahjadi et al., or Chisolm et al. would not in any event yield the invention of Claims 60-69.

It is felt that this is an appropriate place to again mention that Chisolm et al. was issued after the priority date claimed in the present application, and should thus be inapplicable as prior art.

Other combinations in Table 2 form improper rejections because one or both of the cited references teaches away from their combination. Kawahigashi et al. teaches away from combination with Fuhr et al., Kyo et al., Nakahashi et al., Ogo et al., and Tjahjadi et al., all

CASE FR-7095

of which teach polyamides in their compositions, while Kawahigashi teaches drawbacks to the use of polyamides (column 2, lines 49-67), discouraging their use. Claims 60-69 do not call for polyamides. As described in section E above, none of Fuhr et al., Kyo et al., Nakahashi et al., Ogo et al., Tjahjadi et al., and Chisolm et al. teaches additive compositions, which are the subject of Claims 60-69. As stated before, Fuhr et al. does not disclose olefin-based polymers anywhere in the document, thus more strongly teaching away from combination with Kawahigashi.

Still more rejection combinations listed in Table 2 are improper because at least one of the references teaches away from the combination thereof. Hecht et al. and Garrison, Jr. are discussed together, as the Examiner has stated that the teachings of these two references are similar. Both of these references teach away from the present invention. Both Hecht et al. and Garrison, Jr. teach away from combination with both Murtha et al. and Kawahigashi et al. because both Hecht et al. and Garrison, Jr. both teach that zinc oxide, zinc sulfide, and zinc borate do not work with polyethylene terephthalate, while Murtha et al. and Kawahigashi et al. teach the use of zinc compounds in their compositions (Murtha et al., column 8, lines 51-56; Kawahigashi et al., column 5, lines 1-10). Additionally, both Hecht et al. and Garrison, Jr. are narrowly drawn, concerning only polyethylene terephthalates. Murtha et al. makes no mention of polyesters, and Kawahigashi et al., which teaches only polyolefins, more emphatically teaches away from combination with Hecht et al. and Garrison, Jr. Another cited reference, Frye, also teaches away from combinations with Murtha et al. and Kawahigashi et al., both of which teach the use of a halogenated flame retardant, while Frye teaches that there is no need to use a halogenated flame retardant. Myszak, Jr., which teaches flame retardant compositions for good optical properties, teaches away from combination with Murtha et al. and Kawahigashi et al. (Murtha et al., column 9, lines 1-5; Kawahigashi et al., column 3, lines 36-46), both of which disclose that their compositions can be used in electrical applications.

**I. Rejection of Claims 1-6, 8-23, 32-35, and 40-84 under 35 U.S.C. § 103 (a)**

It was felt that the references and their combinations cited for these rejections would be better illustrated in tabular form.

TABLE 3

Murtha et al. 4,001,182 <i>or</i>	in view of	Kawahigashi et al. 5,656,371,
Itoh et al. 5,760,120,		Fuhr et al. 5,021,488,

CASE FR-7095

		Kyo et al. 4,171,330,
		Nakahashi et al. 5,543,452,
		Ogo et al. 5,849,826,
		Tjahjadi et al. 5,863,974,
		Chisolm et al. 6,300,405,
		Hecht et al. 4,338,243,
		Frye 4,387,176 [ <i>sic</i> ],
		Garrison, Jr. 4,708,980,
		Myszak, Jr. 5,409,980 or
		Bryant et al. 5,936,021.

Although quite repetitious at this point in the Remarks, Applicants feel that it is necessary to refer again to M.P.E.P. §706.02, and submit that, regarding this set of rejections, not all of these references, or at the very least, not all of these combinations, constitute the best available art. Moreover, in the present Office Action (at page 5, paragraph 15), the Examiner states that the invention is obvious because the references "reveal every ingredient claimed by applicants." Again, this is not the standard for obviousness under the statute, and uses an incorrect standard for obviousness rejections. It is well settled that the standard for obviousness is that the present invention *would have been* obvious, not that it *is* obvious, as stated in this set of rejections in the present Office Action. That the individual ingredients are known in the art is not sufficient to establish a *prima facie* case of obviousness, in the absence of an objective reason to combine the references. The Examiner is required to point to something in the reference(s) that provides a *motivation or suggestion to combine* these references, which has not been done in regard to any of the above combinations. It is felt that all of the rejections listed in Table 3 are improper and should be withdrawn.

As stated before, references from nonanalogous art areas are impermissible in an obviousness rejection. All of the combinations with Itoh et al. are improper because Itoh et al. is from a nonanalogous art area. Specifically, Itoh et al. concerns a laser marking resin composition which permits markings excellent in degree of coloration and sharpness upon irradiation with a laser, without deteriorating the appearance of the molded article (column 1, lines 27-35). Thus, for this additional reason, the twelve rejections based on combination with Itoh et al. are improper and should be withdrawn.

## CASE FR-7095

It should be pointed out that the rejections of Claims 60-69 in this section involving combinations with Murtha et al. (with the exception of the combination with Kawahigashi et al.) duplicate their rejection combinations with Murtha et al. in section H above. The arguments above regarding combinations with Murtha et al. are thus incorporated here, and these arguments also apply herein to Claims 83-84.

In regard to Claims 1-6, 8-23, 32-35, 40-59, and 70-82, which are directed to flame retardant compositions, particularly for use in electrical applications (Specification, Page 1, paragraph 0002; page 2, paragraph 0006), one of the references cited in combination with Murtha et al. is from a nonanalogous art area. Bryant et al., the nonanalogous art reference, teaches masterbatches for adhesives; further, Bryant et al. does not teach any flame retardant at all in the compositions disclosed therein. Other above-cited combinations form improper rejections because one or both of the cited references teaches away from their combination. Kawahigashi et al. teaches away from combination with Murtha et al. because Kawahigashi teaches drawbacks to the use of polyamides (column 2, lines 49-67), discouraging their use, while Murtha et al. encourages their use (column 1, lines 56-61). Furthermore, Kawahigashi et al. discusses polyamides only in connection with optical cable, not electrical cable applications (column 11, line 65 to column 12, line 7). Hecht et al. and Garrison, Jr. are discussed together, as the Examiner has stated that the teachings of these two references are similar. Both Hecht et al. and Garrison, Jr. teach away from combination with Murtha et al. because Hecht et al. and Garrison, Jr. both teach that zinc oxide, zinc sulfide, and zinc borate do not work with polyethylene terephthalate, while Murtha et al. teaches the use of zinc compounds in its compositions (column 8, lines 51-56). Additionally, both Hecht et al. and Garrison, Jr. are narrowly drawn, concerning only polyethylene terephthalates. Murtha et al. makes no mention of polyesters. Another cited reference, Frye, also teaches away from combination with Murtha et al., because Murtha et al. teaches the use of a halogenated flame retardant, while Frye teaches that there is no need to use a halogenated flame retardant. Myszak, Jr., which teaches flame retardant compositions for good optical properties, teaches away from combination with Murtha et al., which discloses that its compositions can be used in electrical applications (column 9, lines 1-5).

In regard to Claims 1-6, 8-23, 32-35, 40-59, and 70-82, other references that teach away from combination are Fuhr et al., Kyo et al., Nakahashi et al., Ogo et al., Tjahjadi et al., and Chisolm et al. with Murtha et al. Fuhr et al. (column 7, line 55 to column 8, line 3), Kyo et al. (column 2, lines 19-24), Nakahashi et al. (column 2, lines 1-13), Ogo et al. (column 20,

CASE FR-7095

line 45 to column 21, line 27), Tjahjadi et al.(column 4, lines 14-38), and Chisolm et al. (column 6, lines 44-67), all teach the use of flame retardants in which the halogen atoms are on aromatic rings or at unsaturated sites on rings, while Murtha et al. discloses only aliphatic flame retardants in which the halogen atoms are bound to aliphatic carbons (Abstract). Additionally, Fuhr et al. does not teach polyolefins at all, thus more strongly teaching away from combination with Murtha et al., which has as its purpose use with a polyolefin (column 2, lines 65-67).

In light of the foregoing remarks, the case is believed to be in condition for immediate allowance. Prompt notification to this effect would be sincerely appreciated.

If any matters remain that require further consideration, the Examiner is requested to telephone the undersigned at the number given below so that such matters may be discussed, and if possible, promptly resolved. The undersigned is acting pursuant to Rule 34.

Respectfully submitted,



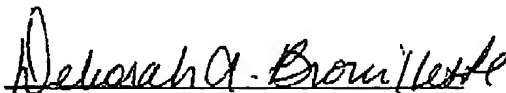
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4-20-2004  
Date

  
Deborah A. Brouillette



*Hawley's*  
*Condensed Chemical*  
*Dictionary*

**THIRTEENTH EDITION**

*Revised by*  
Richard J. Lewis, Sr.



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EXHIBIT A

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## ZINC BORATE

1196

**Grade:** USP.**Use:** Antibacterial agent in ointments, suppositories, etc.

**zinc borate.** Typical composition: zinc oxide 45%,  $B_2O_3$  34%, may have 20% water of hydration. **Properties:** White, amorphous powder. Zinc borate of composition  $3ZnO \cdot 2B_2O_3$  has d 3.64, mp 980°C. Soluble in dilute acids; slightly soluble in water. Nonflammable.

**Derivation:** Interaction of the oxides at 500–1000°C or of zinc oxide slurries with solutions of boric acid or borax.

**Use:** Medicine, fireproofing textiles, fungistat and mildew inhibitor, flux in ceramics. See "Firebrake ZB" [U. S. Borax].

**zinc bromate.**  $Zn(BrO_3)_2 \cdot 6H_2O$ .

**Properties:** White solid. D 2.566, mp 100°C. Deliquescent, loses  $6H_2O$  at 200°C. Very soluble in water.

**Hazard:** Dangerous fire risk in contact with organic materials, strong oxidizing agent.

**zinc bromide.**  $ZnBr_2$ .

**Properties:** White, hygroscopic, crystalline powder. D 4.219, mp 394°C, bp 650°C. Soluble in water, alcohol, and ether.

**Derivation:** Interaction of solutions of barium bromide and zinc sulfate, with subsequent crystallization.

**Use:** Photographic emulsions, manufacture of rayon. A solution of 80% zinc bromide is used as a radiation viewing shield.

**zinc butylxanthate.**  $Zn(C_4H_9OCS_2)_2$ .

**Properties:** White powder. D 1.45. Decomposes when heated; moderately soluble in benzene and ethylene dichloride; slightly soluble in acetone; insoluble in water and gasoline.

**Use:** Ultraaccelerator used in self-curing rubber cements.

See xanthate.

**zinc cadmium sulfide.** A fluorescent pigment, a phosphor.

**Hazard:** As for cadmium.

**zinc caprylate.** (zinc octanoate).

CAS: 557-09-5.  $Zn(C_8H_{17}O_2)_2$ .

**Properties:** Lustrous scales. Mp 136°C, decomposes in moist atmosphere giving off caprylic acid. Slightly soluble in boiling water; fairly soluble in boiling alcohol.

**Derivation:** By precipitation from a solution of ammonium caprylate with zinc sulfate.

**Use:** Fungicide.

**zinc carbolate.** See zinc phenate.

**zinc carbonate.**

CAS: 3486-35-9.  $ZnCO_3$ .

**Properties:** White, crystalline powder. D 4.42–4.45, evolves carbon dioxide at 300°C. Soluble in acids, alkalis, and ammonium salt solutions; insoluble in water.

**Derivation:** (1) Grinding the mineral smithsonite, (2) action of sodium bicarbonate on a solution of a zinc salt.

**Use:** Ceramics, fireproofing filler for rubber and plastic compositions exposed to flame temperature, cosmetics and lotions, pharmaceuticals (ointments, dusting powders), zinc salts, medicine (topical antiseptic).

**zinc chlorate.**

CAS: 10361-95-2.  $Zn(ClO_3)_2 \cdot 4H_2O$ .

**Properties:** Colorless to yellowish crystals. Deliquescent, d 2.15, decomposes at 60°C. Soluble in water, alcohol, glycerol, and ether.

**Hazard:** Dangerous fire risk in contact with organic materials, strong oxidizing agent.

**zinc chloride.**

CAS: 7646-85-7.  $ZnCl_2$ .

**Properties:** White, granular, deliquescent crystals or crystalline powder. D 2.91, mp 290°C, bp 732°C, a 10% solution is acid to litmus. Soluble in water, alcohol, glycerol, and ether.

**Derivation:** Action of hydrochloric acid on zinc or zinc oxide.

**Method of purification:** Recrystallization.

**Grade:** CP, technical; fused, crystals, granulated; 62.5% solution, 50% solution, USP.

**Hazard:** (Solid) skin irritant; (solution) severe irritant to skin and tissue. TLV (fume): 1 mg/m<sup>3</sup>.

**Use:** Catalyst, dehydrating and condensing agent in organic synthesis, fireproofing and preserving food, soldering fluxes, burnishing and polishing compounds for steel, electroplating, antiseptic and deodorant preparations (up to 2% solution), textiles (mordant; carbonizing agent; mercerizing, sizing, and weighting compositions; resist for sulfur colors, albumin colors, and para red), adhesives, dental cements, glass etching, petroleum refining, parchment, dentifrices, embalming and taxidermists' fluids, medicine (astringent), antistatic, denaturant for alcohol.

**zinc chloride, chromated.** A mixture of zinc chloride and sodium dichromate used as a wood preservative. Federal specification TT-W-551 requires that it contain no less than 77.5% zinc chloride and 17.5% sodium dichromate dihydrate.

**zinc chloroiodide.** Mixture of zinc chloride and iodide.

**Properties:** White powder. Soluble in water.

**Use:** Disinfectant, pharmaceutical preparations.

**zinc chromate.**  $ZnCrO_4 \cdot 7H_2O$ .

**Properties:** Solid yellow pigment. Mw 307.6

**Hazard:** TLV: 0.01 mg/m<sup>3</sup>, confirmed human carcinogen.

**Use:** Pigments.

## 1201

## ZINC THIOCYANATE

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**Properties:** Yellowish to reddish crystals. D 5.42 (15/4C), mp above 1100C. Insoluble in water.

**Hazard:** Fire risk in contact with water or acids.

**Use:** Windows in infrared optical equipment, phosphor.

**zinc silicate.** (zinc orthosilicate).  $\text{Zn}_2\text{SiO}_4$ .

**Properties:** White crystals. D 4.103, mp 1509C. Insoluble in water.

**Use:** Phosphors, spray ingredients, to remove traces of copper from gasoline.

See willamite.

**zinc silicofluoride.** See zinc fluorosilicate.

**zinc-silver oxide battery.** Primary or secondary battery used where space and weight are critical, i.e., in missiles. The battery has large energy output for its weight, but the components are expensive and the cycle life is short. To avoid deterioration, potassium hydroxide electrolyte is added just before use.

See battery.

**zinc stearate.**

CAS: 557-05-1.  $\text{Zn}(\text{C}_{18}\text{H}_{35}\text{O}_2)_2$ . Percentage of zinc may vary according to intended use, some products being more basic than others.

**Properties:** (Pure substance) White, hydrophobic powder free from grittiness; faint odor. D 1.095, mp 130C. Soluble in acids and common solvents when hot; insoluble in water, alcohol, and ether. Combustible.

**Derivation:** Action of sodium stearate on solution of zinc sulfate.

**Grade:** USP, technical, available free from chick edema factor.

**Use:** Cosmetics, lacquers, ointments, dusting powder, lubricant, mold-release agent, filler, antifoamer, heat and light stabilizer, medicine (dermatitis), tablet manufacture, dietary supplement.

**zinc sulfate.** (white vitriol; white copperas; zinc vitriol).

CAS: 7733-02-0.  $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ .

**Properties:** Colorless crystals, small needles, or granular, crystalline powder; without odor; astringent, metallic taste. Efflorescent in air. Solutions acid to litmus. D 1.957 (25/4C), mp 100C, loses  $7\text{H}_2\text{O}$  at 280C. Soluble in water and glycerol; insoluble in alcohol.

**Derivation:** (1) Roasting zinc blend and lixiviating with subsequent purification, (2) action of sulfuric acid on zinc or zinc oxide.

**Grade:** Technical, USP, reagent.

**Use:** Rayon manufacture, dietary supplement, animal feeds, mordant, wood preservative, analytical reagent.

**zinc sulfate monohydrate.**  $\text{ZnSO}_4 \cdot \text{H}_2\text{O}$ .

**Properties:** White, free-flowing powder. Soluble in water; insoluble in alcohol.

**Use:** Rayon manufacture, agricultural sprays, chemical intermediate, dyestuffs, electroplating.

**zinc sulfide.**  $\text{ZnS}$ . Exists in two crystalline forms,  $\alpha$  (wurtzite) and  $\beta$  (sphalerite).

**Properties:** Yellowish-white powder. Stable if kept dry.  $\alpha$ : d 3.98.  $\beta$ : d 4.102, changes to  $\alpha$  form at 1020C. Sublimes at 1180C. Soluble in acids; insoluble in water.

**Derivation:** By passing hydrogen sulfide gas into a solution of a zinc salt.

**Grade:** Technical, CP, fluorescent or luminous, single crystals.

**Use:** Pigment, white and opaque glass, base for color lakes, rubber, plastics, dyeing (hydrosulfite process), ingredient of lithopane, phosphor in X-ray and television screens, luminous paints, fungicide.

**zinc sulfite.**  $\text{ZnSO}_3 \cdot 2\text{H}_2\text{O}$ .

**Properties:** White, crystalline powder. Absorbs oxygen from the air to form sulfate. Loses  $2\text{H}_2\text{O}$  at 100C; decomposes at 200C. Soluble in sulfurous acid; insoluble in cold water and alcohol; decomposes in hot water.

**Derivation:** Action of sulfurous acid on zinc hydroxide.

**Use:** Preservative for anatomical specimens.

**zinc sulfo-carbolate.** See zinc phenolsulfonate.

**zinc sulfocyanate.** See zinc thiocyanate.

**zinc sulfophenate.** See zinc phenolsulfonate.

**zinc sulfoxylate.**  $\text{ZnSO}_3$ .

**Properties:** White, crystalline powder. Decomposed by heat; salt of unstable sulfoxylic acid ( $\text{H}_2\text{SO}_2$ ). A strong reducing agent.

**Derivation:** Action of zinc and sulfuryl chloride in ethereal solution or of sulfur dioxide on granulated zinc in absolute alcohol.

**Use:** Stripping agent in dyeing.

**zinc telluride.**  $\text{ZnTe}$ .

**Properties:** Reddish crystals. D 6.34 (15C), mp 1238C. Decomposes in water. Single crystals available for phosphors.

**Derivation:** Reaction of zinc oxide and tellurium powder in alkaline solution.

**Use:** Semiconductor research, photoconductor.

**zinc thiocyanate.** (zinc rhodanide; zinc sulfo-cyanate).  $\text{Zn}(\text{CNS})_2$ .

**Properties:** White, hygroscopic powder or crystals. Soluble in water, alcohol, and ammonium hydroxide.

**Derivation:** Interaction of zinc hydroxide and ammonium thiocyanate.

**Grade:** Technical, solution, reagent, ACS.

**Use:** Analytical chemistry, swelling agent for cellulose esters, dyeing assistant.

## Polypropylene

### Overview

Polypropylene is currently one of the fastest growing polymers with forecasted demand growth at twice GDP for the foreseeable future. Much of this growth is attributed to polypropylene's ability to displace conventional materials (wood, glass, metal) and other thermoplastics at lower cost.

Novolen Technology Holdings C.V. (NTH), an 80/20 joint venture of ABB Lummus Global and Equistar affiliated companies, licenses the Novolen® gas phase polypropylene (PP) technology for the

production of the full range of polypropylene resins. This reliable, versatile and environmentally clean process makes products meeting the requirements of even the most demanding applications.

ABB is the only company to offer technology integration between propylene and polypropylene with four processes aimed at producing or maximizing propylene from upstream refinery and petrochemical units.

### Advantages

Process Features	Client Benefits
Produces full range of homopolymers, random and impact copolymers in only two reactors with a selection of catalysts, including metallocene	Covers broad range of products for all markets/applications, including ultra-high (up to 50%) rubber-content impact copolymers and terpolymers
Exceptional lot-to-lot and within-lot uniformity	Necessary for film and fiber applications, which need consistent and tight specifications
Exclusive pellet degassing	Products with the lowest volatile content in the marketplace • very low taste and odor level for highly demanding applications (e.g. food packaging)
Simple, gas-phase, solvent-free process	Among the lowest operating and maintenance costs in the industry
Small reactor volume minimizes reactor residence time	Rapid grade changes generate minimal "off-specification" product • reduced inventory results in inherently safer process • minimizes capital investment

### Performance Characteristics

The Novolen polypropylene process utilizes one or two vertical, stirred bed, gas-phase reactors. Homopolymers and random copolymers can be manufactured either in a single reactor or in a reactor cascade with two reactors, depending on the required capacity and product range. Impact copolymers require two reactors connected in series: In the first reactor, propylene homopolymer or random copolymer is polymerized; in the second reactor, rubber is added by polymerizing an ethylene/propylene mixture.

#### *The polypropylene product portfolio covers a wide range of properties:*

Melt flow rate (MFR)	0.1 - 120++g/10 min.
Isotacticity	90% - 99%+
Tensile modulus	300 - 2,400 MPa
Tensile yield stress	10 - 40 MPa
Impact strength	No break at -30°C (reactor blends)
Transparency (1mm disc)	Up to 93% for Ziegler/Natta PP Up to 96% for Metallocene PP
Melting temperature	125°C - 165°C

## Polypropylene

### Process Description

Propylene, ethylene and any other required comonomers are fed into the reactor(s). Hydrogen is added to control the molecular weight. Polymerization conditions (temperature, pressure and reactant concentrations) are set by the polymer grade being made. The reaction itself is exothermic and reactor cooling is achieved by flash heat exchange, where liquefied reactor gas is mixed with fresh feed and injected into the reactor; flash evaporation of the liquid in the polymer bed ensures maximum heat exchange.

The polymer powder is discharged from the reactor and separated in a discharge vessel at atmospheric pressure. Any unreacted monomer

separated from the powder is compressed and either recycled or returned to the upstream olefins unit for recovery. The polymer is flushed with nitrogen in a purge vessel to strip it of residual propylene. The purge vessel offgas is passed to a recovery system; the powder is transported to powder silos and is then converted into pellets that incorporate a full range of well-dispersed additives.

For highly demanding applications requiring extremely low volatiles and odor levels, the Novolen process offers an optional degassing unit to treat the pellets after extrusion.

### Process Flow Diagram

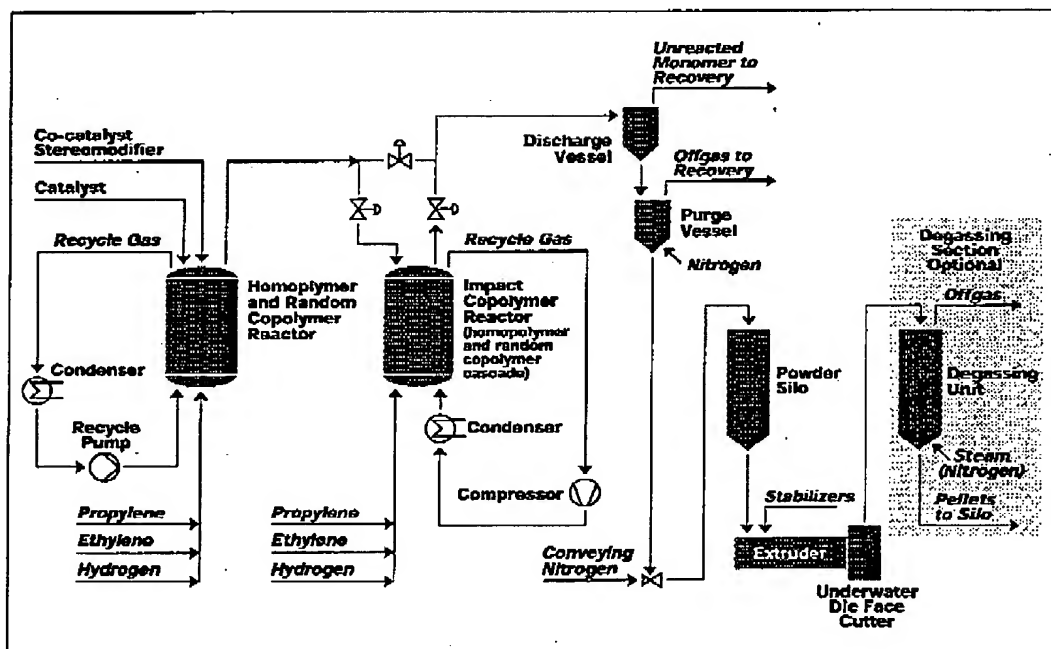


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## Polyolefins About Dow Polyolefins

### What is Polypropylene?

Producing a polymer begins with its basic building block: the monomer. A monomer is an individual molecule. Either by reacting under the effect of heat and/or pressure, the monomer grows to form one long chain of monomers called a "polymer," from the Greek "poly," meaning many, and "mer," meaning units.

Polypropylene is a long chain polymer made from propylene monomers. See [Propylene Monomer](#) and [Polypropylene Polymer](#). After exposing the propylene to both heat and pressure with an active metallic catalyst, the propylene monomers combine to form a long polymer chain, called "polypropylene." Several different polymerization methods are used to produce polypropylene.

Depending on the catalyst and the polymerization method used, the molecular configuration can be altered to produce three types of polypropylene:

- o Atactic
- o Isotactic
- o Syndiotactic

[Atactic, Isotactic and Syndiotactic Polypropylene](#) shows examples of each type of polypropylene.

### Polymer Characteristics

Atactic polymers are characterized by their tacky, amorphous behavior and low molecular weights. They provide the same effect as a plasticizer, by reducing the crystallinity of the polypropylene. A small amount of atactic polymers in the final polymer can be used to improve certain mechanical properties. This provides properties to the final polymer, such as improved low temperature performance, elongation, processability and optical properties, but sacrifices flexural modulus or stiffness, and long-term heat aging properties.

From a commercial viewpoint, isotactic polypropylene is the most important. In comparison to atactic and syndiotactic, isotactic polypropylene is the most stereo-regular structure of polypropylene. From this, a higher degree of crystallinity is achieved. As a result, many of polypropylene's mechanical properties and processability are heavily determined by the level of isotacticity and thus crystallinity.

Although the increased crystallinity of polypropylene makes the material less tough than polyethylene, it also provides polypropylene with a higher flexural modulus, and tensile properties much higher than polyethylene. This allows polypropylene to be used as a replacement for engineered thermoplastics, such as ABS.

Syndiotactic polypropylene has just recently become a commercial reality.

### Polyolefins Home

### Polypropylene Technology Primer

[What is Polypropylene?](#)

[Polypropylene vs. ETP](#)

[Typical Characteristics](#)

[Shrinkage Prediction](#)

[Shrinkage Data for Impact Copolymer with 20 MFR](#)

[Shrinkage Data for Impact Copolymer with 35 MFR](#)

### Site Navigation:

[Polyolefins Home About Dow](#)  
[Polyolefins: Dow Polypropylene:](#)  
[Polypropylene Technical](#)  
[Center: Technology Primer: What is](#)  
[Polypropylene?](#)

### EXHIBIT C

<http://www.dow.com/polyolefins/about/pptechctr/primer/what.htm>

4/5/2004